

California Electric Rule 21 Interconnection of Distributed Resources on Secondary Network Distribution Systems

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California Energy Commission
Rule 21 Working Group



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1. Introduction

Under California PUC OII XXX, the California Energy Commission was asked to review issues related to the interconnection of Distributed Resources to determine what changes might be facilitated in Rule 21, what guidance might be offered for Supplemental Review, and what additional data/information would be useful in establishing concrete requirements. In response the CPUC request, the Rule 21 Working Group developed a Network Interconnection Workplan, shown in Annex A. This report describes the information obtained and the conclusions reached by the Energy Commission's Rule 21 Workgroup following that workplan

2. Background

A general description of secondary networks, including definitions, basic design and equipment, and a preliminary list of issues related to DG interconnection is provided in the DUIT report *Network Distribution Systems Background And Issues Related To The Interconnection Of Distributed Resources* attached as Appendix B.

2.1. Spot and Area Secondary Network Distribution Systems In California

Approximately XX customers, representing YY MW/ ZZMWh of peak and annual load, are served by secondary networks, either grid or spot. The following sections provide some of the details of secondary networks by utility

2.1.1 Pacific Gas and Electric

2.1.2 Southern California Edison

2.1.3 San Diego Gas and Electric

2.1.4 Sacramento Municipal Utility District

2.1.5 Los Angeles Department of Water and Power

2.1.6 ???

2.1.7 ???

2.1.8 Others

2.2. Distributed Resources Interconnected to Secondary Network Distribution Systems In California

3. References

3.1. Other Projects and Sources of Information

3.2. Existing Network Interconnection Requirements

4. Issues Related to Network Interconnection

5. Costs Associated with Network Interconnection

6. Workgroup Recommendations

6.1. Suggested Changes to Rule 21

6.2. Suggested Changes to Supplemental Review Guideline

6.3. Topics and Issues Needing Additional Information or Testing

Annexes

Annex A. Rule 21 Workgroup Interconnection Rules for Secondary Network Systems

1 Introduction

The requirements for interconnecting generating facilities to secondary network systems are different than those for interconnections to radial systems. In the secondary network system, there are technical requirements to be considered particularly with the design and operational aspects of network protectors that are not required on radial system. In California, the major secondary network systems are located mainly in the metropolitan areas of San Francisco, Oakland, and Sacramento. Several generating facility projects have been interconnected to various secondary network systems over the past few years. Due to lack of technical information and clear guidelines, there have been issues with some of these interconnections. By the current screening process in Rule 21, applications for interconnection to secondary networked systems are advanced to the “supplemental review” stage. Due to the complexities and varieties of protective schemes used in the networked systems, most of these interconnections require a detailed study. Without suitable guidelines, utility companies will have to study each project and establish requirements on a case by case basis to allow a safe and reliable interconnection of these generating facilities to their secondary network system.

There has been an interest from the California Energy Commission’s Integrated Energy Policy Report committee and other stakeholders to determine if any simple and uniform rules for interconnection of DG to networked systems maybe added to Rule 21 (or to the Supplemental Review Guideline). Similar interconnection issues and the need for guidelines have also been identified in other part of United State. Some of the on-going efforts by other utilities and engineering groups addressing and working on this issue are as follows:

- ✓ Massachusetts Technical Collaborative Working group is developing network requirements for that state’s DG interconnection rules.
- ✓ California Energy Commission in collaboration with DOE has initiated the development of a testing program to study network interconnections. Testing will conducted by the Distributed Utility Associates in California as Phase 2 of the Distributed Utility Integration Test (DUIT) project.
- ✓ PG&E Draft requirements
- ✓ Expand the status of these items

2 Work Plan Outline

Rule 21 technical working group has developed the following plan outline for this purpose.

2.1 Basic Objectives:

- Define the issues
- Determine general requirements (i.e., Rule 21 Section D)
- Determine requirements for simplified interconnection (i.e., Rule 21 Section I)
- Develop Supplemental Review pathways.

2.2 Tasks:

1. Develop definitions, characteristics, and design philosophies for different types of networks to provide a common basis of understanding
 - DUIT report
 - MDGC Report
2. Identify network systems in CA
 - Location
 - Physical characteristics
3. Identify the stakeholders nationwide who may be able to provide information
 - Utilities with network systems
 - DG suppliers
 - Customers on network systems who may be interested in DG
 - Regulators
 - Network equipment providers and other experts
4. Identify and Investigate other Projects and sources of documentation
 - DUIT Network meeting and Network-related testing
 - Massachusetts DG Collaborative
 - PG&E white paper
 - IEEE 1547.6 (PAR to be submitted)
 - Manufacturer data sheets/white papers
 - FOCUS Field monitoring study
 - EPRI Study (?)
5. Identify and investigate the availability of other Rules and requirements
6. Identify and investigate existing DR on networks
7. Identify problems and solutions
 - Experience from utilities
 - Experience from system integrators
8. Investigate costs
 - Protection Schemes
 - Protector rework

Annex B. DUIT Report on Networks